

construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

[00041] Accordingly, what is claimed is

1. A method of treating wastewater comprising:
 - a) providing a wastewater source containing lignin;
 - b) adding a supply of simple sugar to the wastewater source; and
 - c) adding a supply of white rot fungus into the wastewater source in the presence of the simple sugar wherein the simple sugar accelerates the production of pholoxidases from the white rot fungus which break down at least a portion of the lignin.
2. The method of claim 1 wherein the simple sugar is batch added to the wastewater source.
3. The method of claim 1 wherein the step of adding the simple sugar further comprises the step of converting one of cellulose and hemi-cellulose to glucose by a brown rot fungus.
4. The method of claim 3 further comprising the step of adding the brown rot fungus to the wastewater source prior to the step of adding the white rot fungus.
5. The method of claim 4 wherein the brown rot fungus added is at least one of trichoderma ressei, trichoderma hazanium, aspergillus versicolor and chaetomium dolichotricum fusarium solani.
6. The method of claim 5 wherein the brown rot fungus is allowed to grow to a population in the range of about 10^6 – about 10^{16} CFU/ml.

7. The method of claim 5 further comprising the step of adding at least one of the bacteria selected from the group of *clostridium cellulolyticum* and *clostridium celluloverans* to the wastewater source.
8. The method of claim 1 wherein the wastewater source provided is from at least one of a paper and a pulp mill and a wastestream containing lignin compounds.
9. The method of claim 1 wherein the white rot fungus added is at least one of *phanerochaete chrysosporium*, *phanerochaete sorida*, *pluerotis ostreatus*, *bjerkandera adusta*, *pycnoporus cinnabariunus*, *trametes versicolor*, and *stagonospora gigaspora*.
10. The method of claim 9 wherein the white rot fungus is allowed to grow to a population in the range of about $10^6 - 10^{16}$ CFU/ml in the wastewater source.
11. The method of claim 1 wherein the white rot fungus is added through seeding in several steps over time.
12. The method of claim 1 wherein the breaking down of the lignin reduces at least one of the color, the BOD or COD present in the wastewater source.

13. A method of treating wastewater comprising:
- a) providing a wastewater source having lignin;
 - b) adding brown rot fungi into the wastewater source in the presence of at least one of hemicellulose and cellulose;
 - c) allowing the brown rot fungi to convert at least some of the at least one of hemicellulose and cellulose into glucose;
 - d) adding white rot fungi into the wastewater source;
 - e) allowing the white rot fungi to produce phenoloxidasases in the presence of glucose to degrade at least a portion of the lignin in the wastewater source.
14. The method of claim 13 wherein at least one of the brown rot fungi and white rot fungi is added through seeding in batches.
15. The method of claim 13 further comprising the step of adding at least one of clostridium cellulolyticum and clostridium celluloverans.
16. The method of claim 13 wherein the brown rot fungi added is at least one taken from the group of trichoderma ressei, trichoderma hazanium, aspergillus versicolor and chaetomium dolichotricum fusarium solani.

17. The method of claim 13 wherein the white rot fungi added is at least one taken from the group of *phanerochaete chrysosporium*, *phanerochaete sorida*, *pluerotis ostreatus*, *bjerkandera adusta*, *pycnoporus cinnabariunus*, *trametes versicolor*, and *stagonospora gigaspora*.

18. A method of treating wastewater comprising:

- a) providing a wastewater source;
- b) adding brown rot fungi into the wastewater source in the presence of at least one of hemi-cellulose and cellulose;
- c) allowing the brown rot fungi to convert at least some of the at least one of hemi-cellulose and cellulose into glucose;
- d) adding white rot fungi into the wastewater source;
- e) allowing the white rot fungi to produce phenoloxidases in the presence of glucose to assist in treating the wastewater source.

19. The method of claim 18 wherein the treating of the wastewater source further comprises one of reducing the color of the wastewater, BOD and COD.

20. The method of claim 18 wherein the wastewater source has lignin, and the phenoxidases in the white rot fungi break down at least a portion of the lignin.

21. The method of claim 18 wherein at least one of the brown rot fungi and white rot fungi is added through seeding in batches.

22. The method of claim 18 wherein comprising the step of adding at least one of *clostridium cellulolyticum* and *clostridium celluloverans*.
23. The method of claim 18 wherein a method of treating wastewater comprising:
- a) providing a wastewater source having lignin;
 - b) adding brown rot fungi into the wastewater source in the presence of at least one of hemicellulose and cellulose;
 - c) allowing the brown rot fungi to convert at least some of the at least one of hemicellulose and cellulose into glucose;
 - d) adding white rot fungi into the wastewater source;
 - e) allowing the white rot fungi to produce phenoloxidases in the presence of glucose to degrade at least a portion of the lignin in the wastewater source.
24. A method of claim 18 wherein a method of treating wastewater comprising:
- a) providing a wastewater source;
 - b) adding brown rot fungi into the wastewater source in the presence of at least one of hemi-cellulose and cellulose;
 - c) allowing the brown rot fungi to convert at least some of the at least one of hemi-cellulose and cellulose into glucose;
 - d) adding white rot fungi into the wastewater source;
 - e) allowing the white rot fungi to produce phenoloxidases in the presence of glucose to assist in treating the wastewater source.